AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A moving picture editing method for editing compression coded moving ~~picture~~ pictures by utilizing inter-frame prediction based on motion compensation, ~~wherein~~the method comprising:

determining if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not deleted during editing ~~in edition so as to constitute a part of the moving picture after editing, is or~~ are subject to error generation in processing ~~although not subject to lack in edition,~~; and

searching motion vectors in a range centered on each pre-edit motion vector ~~before editing~~ of the subject frame ~~are searched for~~to find ~~the~~ a post-edit motion vector ~~after editing~~ corresponding to ~~the~~ a minimum value of ~~the~~ a difference between ~~the~~ a pre-edit motion compensated picture ~~before editing~~ and a post-edit motion compensated picture ~~after editing~~.

2. (currently amended): A moving picture editing method for editing compression coded moving ~~picture~~ pictures by utilizing inter-frame prediction based on motion compensation, ~~wherein~~the method comprising:

determining if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not

deleted during editing ~~in edition so as to constitute part of the moving picture after editing, is or~~ are subject to error generation in processing ~~although not subject to lack in edition,~~;

searching motion vectors in a range centered on each pre-edit motion vector ~~before editing~~ of the subject frame ~~are searched for~~to find ~~the~~ a post-edit motion vector ~~after editing~~ corresponding to ~~the~~ a minimum value of ~~the~~ a difference between ~~the~~ a pre-edit motion compensated picture ~~before editing~~ and a post-edit motion compensated picture ~~after editing,~~;

obtaining the post-edit motion compensated picture by motion compensation utilizing the post-edit motion vector; ~~and~~

coding a picture difference obtained as a result of subtraction of the post-edit motion compensated picture ~~after edition, obtained by motion compensation utilizing motion vector after editing,~~ from pre-edit decoded data ~~before editing~~ of the subject frame~~, is coded~~ to obtain post-edit picture difference coded data ~~after editing,~~ ; and

coding ~~is performed from~~ the post-edit picture difference coded data ~~after editing thus obtained~~ and the post-edit motion vectors ~~after editing~~ to obtain post-edit coded data ~~after editing~~ of the subject frame.

3. (currently amended): A moving picture editing method for editing compression coded moving picture by utilizing inter-frame prediction based on motion compensation, ~~wherein~~the method comprising:

determining if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not

deleted during editing ~~in edition so as to constitute part of the moving picture after editing, is~~ are subject to error generation in processing ~~although not subject to lack in edition, and also~~;

determining if ~~either~~ at least one of the reference frames meets at least a condition that error generation in the reference frame ~~it takes place as a result of~~results from re-encoding ~~in edition~~during editing or a condition that the coded data has changed and the motion vector ~~are~~ has changed ~~in edition~~during editing such that ~~the~~ a number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing~~ ~~exceed~~ exceeds a ~~predetermined~~ threshold number~~,~~;

searching motion vectors in a range centered on each pre-edit motion vector ~~before editing~~ of the subject frame ~~are searched for~~to find the post-edit motion vector ~~after editing~~ corresponding to ~~the~~ a minimum value of ~~the~~ a difference between ~~the~~ a pre-edit motion compensated picture ~~before edition~~ and a post-edit motion compensated picture ~~after editing~~, and

counting~~also~~ the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing are counted~~.

4. (currently amended): A moving picture editing method for editing compression coded moving picture by utilizing inter-frame prediction based on motion compensation, ~~wherein~~the method comprising:

determining if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not deleted during editing ~~in edition so as to constitute part of the moving picture after editing, is~~are

subject to error generation in processing ~~although not subject to lack in edition;~~, ~~and also~~

determining if ~~either~~ at least one of the reference frames meets at least a condition that ~~its~~ error generation in the reference frame results from ~~takes place as a result of~~ re-encoding ~~in edition~~during editing or a condition that coded data ~~is~~ has changed~~,~~ and a picture difference ~~is~~ has been re-encoded ~~in edition~~during editing and ~~the~~ a number of macroblocks of post-edit picture difference coded data ~~after editing~~ and a number of macroblocks of pre-edit picture difference coded data ~~before editing~~ exceed a ~~predetermined~~ threshold number~~,~~;

obtaining a post-edit motion compensated picture by motion compensation utilizing the post-edit motion vector of a subject frame;

subtracting the post-edit motion compensated picture from pre-edit decoded data of the subject frame to obtain the picture difference;

coding the picture difference ~~obtained as a result of subtraction of motion compensated picture after editing, obtained by motion compensation utilizing the motion vector after editing of the subject frame, from decoded data before editing of the subject frame is coded~~ to obtain the post-edit picture difference coded data ~~after editing, also~~;

coding ~~is performed from~~ the post-edit picture difference coded data ~~after editing~~ and the pre-edit motion vectors ~~before editing~~ to obtain post-edit coded data ~~after editing~~ of the subject frame~~,~~ and the number of macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and the pre-edit picture difference coded data ~~before editing~~.

5. (currently amended): A moving picture editing method for editing compression coded

moving picture by utilizing inter-frame prediction based on motion compensation, ~~wherein~~the method comprising:

determining if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not deleted ~~in edition~~during editing ~~so as to constitute part of the moving picture after editing, is~~ are subject to error generation in processing ~~although not subject to lack in edition~~during editing~~,~~; ~~and also~~

determining if ~~either~~ at least one of the reference frames meets a condition that ~~the~~ coded data and a motion vector are changed ~~in edition~~during editing~~,~~ such that ~~the~~ a number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing exceed~~ exceeds a ~~predetermined~~ threshold number, ~~and~~or ~~also~~ meets at least a condition that the coded data is not changed ~~in edition~~during editing, a condition that ~~the~~ a picture difference is not re-encoded ~~in edition~~during editing~~,~~ although the coded data is changed therein, or a condition that, although ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference has been re-encoded ~~have taken place in edition~~during editing, the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing~~ is less than a ~~predetermined~~ threshold number,

searching motion vectors in a range centered on each pre-edit motion vector ~~before editing~~ of the subject frame ~~are searched~~ for the motion vector corresponding to ~~the~~ a minimum value of ~~the~~ a difference between ~~the~~ a pre-edit motion compensated picture ~~before editing~~

~~and~~and a post-edit motion compensated picture~~ after editing, and~~;

counting the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing are counted~~;

determining if the ~~one or two~~ reference frames each meet at least a condition that the coded data ~~is~~ has not changed ~~in edition~~during editing, a condition that the motion vectors are not changed ~~in edition~~during editing, or a condition that~~,~~ the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing~~ is less than a ~~predetermined~~ threshold number~~,~~;

~~while~~ determining if the ~~one or two~~ reference frames meet a condition that ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference has been re-encoded ~~have taken place in edition~~during editing such that the number of macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and the pre-edit picture difference coded data ~~before editing exceed~~ exceeds a ~~predetermined~~ threshold number~~,~~;

~~picture difference obtained as a result of subtraction of~~subtracting the post-edit motion compensated picture ~~after editing, obtained by motion compensation utilizing the motion vector after editing of the subject frame,~~ from pre-edit decoded data ~~before editing~~ of the subject frame ~~is~~ to obtain a picture difference;

coded coding the picture difference to obtain post-edit picture difference coded data ~~after editing, also~~;

coding ~~is performed from~~ the post-edit picture difference coded data ~~after editing~~ and the post-edit motion vector ~~after editing~~ of the subject frame~~, and~~;

counting the number of macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and the pre-edit picture difference coded data ~~before editing are counted~~; and

determining if one of the ~~one or two~~ reference frames meets at least a first condition that it is a frame subject to error generation due to re-encoding ~~in edition~~during editing, or a second condition that ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference has been re-encoded ~~have taken place in edition~~during editing such that the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing exceed~~ exceeds a ~~predetermined~~ threshold number and the number of macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and the pre-edit picture difference coded data ~~before editing exceed~~ exceeds a ~~predetermined~~ threshold number~~,~~;

searching motion ~~vector~~ vectors in a range centered on the pre-edit motion vector ~~before editing~~ of the subject frame ~~are searched for~~to find the motion vector corresponding to ~~the~~ a minimum value of ~~the~~ a difference between the pre-edit motion compensated picture ~~before editing~~ and the post-edit motion compensated picture ~~after editing,~~;

counting the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing are counted,~~;

~~picture difference obtained as a result of subtraction~~ subtracting ~~of~~ the post-edit motion compensated picture ~~after editing, obtained by motion compensation utilizing the motion vector after editing of the subject frame,~~ from the pre-edit decoded data ~~before editing~~ of the subject

frame to obtain post-edit picture difference coded data ~~after editing,~~;

coding ~~is performed from~~ the post-edit picture difference coded data ~~after editing~~ and the pre-edit motion vector ~~before editing~~ to obtain post-edit coded data ~~after editing~~ of the subject frame~~,~~; and

counting the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing are counted~~.

6. (currently amended): The moving picture editing method as in any one of claims 1-3 or 5, wherein candidates for each post-edit motion ~~vectors~~ vector ~~after editing~~ are limited to motion vectors present in a ~~predetermined~~ range centered on the pre-edit motion vector ~~before editing~~.

7. (currently amended): The moving picture editing method as in any one of claims 1-3 or 5, wherein candidates for each post-edit motion ~~vectors~~ vector ~~after editing~~ are limited to motion vectors~~,~~ which are equal to the pre-edit motion vector ~~before editing~~ or motion vectors present in a ~~predetermined~~ range centered on the pre-edit motion vector ~~before editing~~ and having a non-integer coordinate value as a horizontal or vertical coordinate value.

8. (currently amended): A moving picture editing system for editing compensation coded moving picture by utilizing inter-frame prediction based on motion compensation, the system comprising:

a motion vector searcher ~~for searching~~which searches motion vectors in a range centered on each pre-edit motion vector ~~before editing for~~ to find a motion vector corresponding to ~~the~~ a minimum value of ~~the~~ a difference between a pre-edit motion compensated picture ~~before editing~~ and a post-edit motion compensated picture ~~after editing~~; and

a controller ~~for controlling~~which controls the motion vector searcher to search for the post-edit motion vector of the subject frame~~, if~~ when ~~one or two~~ reference frames which were utilized for motion compensation of a picture frame~~, constituting a part of the moving picture before editing~~ and which were not deleted ~~in edition~~during editing ~~so as to constitute part of the moving picture after edition, is~~ are subject to error generation in processing ~~although not subject to lack in edition~~during editing~~, the motion vector searcher to search for the motion vector after editing of the subject frame~~.

9. (currently amended): The moving picture editing system according to claim 8, further comprising:

a motion compensator ~~for executing~~which performs motion compensation utilizing the post-edit motion vector ~~after editing~~ to obtain a post-edit motion compensated picture ~~after editing~~;

a subtracter ~~for subtracting~~which subtracts the post-edit motion compensated picture ~~after editing~~ from pre-edit decoded data ~~before editing~~ of the subject frame to obtain a picture difference; and

a variable length coder ~~for executing coding from~~which codes the post-edit picture

difference coded data ~~after editing~~ and the post-edit motion vector ~~after editing~~ to obtain post-edit coded data ~~after editing~~ of the subject frame.

10. (currently amended): A moving picture editing system for editing compensation coded moving picture by utilizing inter-frame prediction based on motion compensation, the system comprising:

a motion vector searcher ~~for searching~~which searches motion vectors in a range centered on each pre-edit motion vector ~~before editing for~~ to find a motion vector corresponding to ~~the~~ a minimum value of ~~the~~ a difference between a pre-edit motion compensated picture ~~before editing~~ and a post-edit motion compensated picture ~~after editing~~;

a counter ~~for counting~~which counts macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing~~; and

a controller ~~functioning such that, if~~which controls the motion vector searcher and the counter,

wherein when ~~one or two~~ reference frames which were utilized for motion compensation of ~~a~~ the subject frame~~, constituting a part of the moving picture~~ before editing and which were not deleted ~~in edition~~during editing ~~so as to constitute a part of the moving picture after editing,~~ ~~is~~ are subject to error generation in processing ~~although not subject to lack in edition~~, and ~~also~~ if ~~either~~ at least one of the reference frames meets at least a condition that error generation in ~~it~~ the reference frame results from ~~takes place as a result of~~ re-encoding ~~in edition~~during editing or a condition that ~~the~~ coded data has changed and the motion vector ~~are~~ has changed ~~in~~

~~edition~~during editing such that ~~the~~ a number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing exceed~~ exceeds a ~~predetermined~~ threshold number, ~~it~~the controller controls the motion vector searcher to search for the post-edit motion vector ~~after editing of~~ the subject frame and the counter to count the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ and the post-edit motion vector ~~after editing~~.

11. (currently amended): A moving picture editing system for editing compensation coded moving picture by utilizing inter-frame prediction based on motion compensation, the system comprising:

a motion compensator ~~for executing~~which performs motion compensation utilizing a post-edit motion vector ~~after editing~~ to obtain a post-edit motion compensated picture ~~after editing~~;

a subtracter ~~for subtracting~~which subtracts motion the post-edit compensated picture ~~after editing~~ from pre-edit decoded data ~~before editing~~ of ~~the~~ a subject frame to obtain a picture difference;

a variable length coder ~~for executing coding from~~which codes the post-edit picture difference coded data ~~after editing~~ and the post-edit motion vector ~~after editing~~ to obtain post-edit coded data ~~after editing~~ of the subject frame;

a counter ~~for counting~~which counts macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and the pre-edit picture difference coded data

~~before editing~~; and

a controller ~~functioning such that,~~which controls the motion compensator to obtain the post-edit motion vector ~~after editing~~ of the subject frame, controls the subtracter to subtract the post-edit motion compensated picture ~~after editing~~ from the decoded data before editing of the subject frame, controls the picture difference coder to code the post-edit picture difference coded data ~~after editing~~, controls the variable length coder to code the post-edit coded data ~~after editing~~ of the subject frame, and controls the counter ~~if~~ when ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture~~ before editing and which were not deleted ~~in edition~~during editing ~~so as to constitute a part of the moving picture after editing, is~~ are subject to error generation in processing ~~although not subject to lack in edition~~during editing, and ~~also~~ if ~~either~~ at least one of the reference frames meets at least a condition that error generation in the reference frame results from ~~it takes place as a result of~~ re-encoding ~~in edition~~during editing or from a condition that ~~the~~ coded data ~~is~~ has changed ~~in edition~~during editing and the picture difference is re-encoded such that the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing exceed~~ exceeds a ~~predetermined~~ threshold number~~, it controls the motion compensator to obtain the motion vector after editing of the subject frame, the subtracter to subtract the motion compensated picture after editing from the decoded data before editing of the subject frame, the picture difference coder to code the picture difference coded data after editing, variable length coder to code the coded data after editing of the subject frame, and the counter to count the number of macroblocks having~~

~~difference between picture difference coded data after editing and picture difference coded data before editing~~.

12. (currently amended): A moving picture editing system for editing compensation coded moving picture by utilizing inter-frame prediction based on motion compensation, the system comprising:

a motion vector searcher ~~for searching~~which searches motion vectors in a range centered on each pre-edit motion vector ~~before editing for~~to find a motion vector corresponding to ~~the~~ a minimum value of ~~the~~ a difference between a pre-edit motion compensated picture ~~before editing~~ and a post-edit motion compensated picture ~~after editing~~;

a first counter ~~for counting~~which counts a ~~the~~ number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing~~;

a motion compensator ~~for performing~~which performs motion compensation utilizing the post-edit motion vector of ~~the~~ a subject frame ~~after editing~~ to obtain a motion compensated picture;

a subtracter ~~for subtracting~~which subtracts the post-edit motion compensated picture ~~after editing~~ from ~~the~~ pre-edit decoded data ~~before editing~~ of the subject frame;

a picture difference coder ~~for coding~~which codes the post-edit picture difference coded data ~~after editing~~ from the picture difference;

a variable length coder ~~for coding~~which codes the post-edit coded data ~~after editing~~ of the subject frame from the post-edit difference picture coded data ~~after editing~~ and the post-edit

motion vector ~~after editing~~;

a second counter ~~for counting~~which counts macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing~~; and

a controller, ~~functioning such that:~~

wherein if ~~one or two~~ reference frames which were utilized for motion compensation of a subject frame~~, constituting a part of the moving picture before editing~~ and which were not deleted ~~in edition~~during editing ~~so as to constitute a part of the moving picture after editing, is~~are subject to error generation in processing ~~although not subject to lack in edition~~during editing, and ~~also~~ if ~~either~~ at least one of the reference frames meets a condition that the coded data has changed and the motion vector ~~are~~ has changed ~~in edition~~during editing, such that ~~the~~ a number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing exceed~~exceeds a ~~predetermined~~ threshold number, ~~and also~~or meets at least a condition that the coded data ~~is~~ has not changed ~~in edition~~during editing, a condition that the picture difference is not re-encoded ~~in edition~~during editing~~,~~ although the coded data ~~is~~ has changed therein, or a condition that, although ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference has been re-encoded ~~have taken place in edition~~during editing, the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing~~ is less than a ~~predetermined~~ threshold number, ~~it~~ the controller controls the motion vector searcher to search the post-edit motion vector ~~after editing~~ of the subject frame and ~~also control~~ controls

the first counter to count the number of macroblocks having a difference between the pre-edit motion vector ~~before editing~~ of the subject frame and the post-edit motion vector ~~after editing~~ thereof, and

wherein if the ~~one or two~~ reference frames each meet at least a condition that the coded data ~~is~~ has not changed ~~in edition~~during editing, a condition that motion vectors ~~are~~ have not changed ~~in edition~~during editing, or a condition that ~~the~~ a number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing~~ is less than a ~~predetermined~~ threshold number, ~~while~~ or the ~~one or two~~ reference frames meet a condition that ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference ~~have taken place~~has been re-encoded ~~in edition~~during editing such that the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing exceed~~exceeds a ~~predetermined~~ threshold number, ~~it~~ the controller controls the motion compensator to obtain a post-edit motion compensated picture ~~after editing~~ of the subject frame, controls the subtracter to subtract the post-edit motion compensated picture ~~after editing~~ of the subject frame from post-edit decoded data ~~after editing~~ of the subject frame so as to obtain a picture difference, controls the picture difference coder to execute coding to obtain post-edit picture difference coded data ~~after editing~~ of the subject frame and controls the second counter to count macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ of the subject frame and the pre-edit picture difference coded data ~~before editing~~ thereof, and

~~if~~ at least one of the ~~one or two~~ reference frames meets at least a first condition that it is a

frame subject to error generation due to re-encoding ~~in editionduring~~ editing, or a second condition that ~~change in~~ the coded data has changed and ~~re-encoding of~~ the picture difference has been re-encoded ~~have taken place in editionduring~~ editing such that the number of macroblocks having a difference between a pre-edit motion vector ~~before editing~~ and a post-edit motion vector ~~after editing exceed~~exceeds a ~~predetermined~~ threshold number and the number of macroblocks having a difference between post-edit picture difference coded data ~~after editing~~ and pre-edit picture difference coded data ~~before editing exceed~~exceeds a ~~predetermined~~ threshold number, ~~it~~ the controller controls the motion vector searcher to search for the post-edit motion picture ~~after editing~~ of the subject frame, controls the first counter to count macroblocks having a difference between a post-edit motion vector ~~before editing~~ of the subject frame and a pre-edit motion vector ~~before editing~~ thereof, controls the subtracter to subtract the post-edit motion vector ~~after editing~~ of the subject frame from the pre-edit decoded data ~~before editing~~ of the subject frame so as to obtain the a picture difference, controls the picture difference coder to execute coding so as to obtain the post-edit picture difference coded data ~~after editing~~ of the subject frame, controls the variable length coder to execute coding so as to obtain post-edit coded data ~~after editing~~ of the subject frame and controls the second counter to count macroblocks having a difference between the post-edit picture difference coded data ~~after editing~~ of the subject frame and the pre-edit picture difference coded data ~~after editing~~ thereof.

13. (currently amended): The moving picture editing system as in any one of claims 8-10 or 12, wherein the controller limits the range of search of motion vectors after editing in the

motion vector searcher to motion vectors~~,~~ which are the same as the post-edit motion vector ~~after editing~~ or motion vectors present in a range in the neighborhood of the post-edit motion vector ~~after editing~~.

14. (currently amended): The moving picture editing system as in any one of claims 8-10 or 12, wherein the controller limits the range of search of motion vectors after editing in the motion vector searcher to motion vectors~~,~~ which are the same as the post-edit motion vector ~~after editing~~ or motion vectors present in a range in the neighborhood of the post-edit motion vector ~~after editing~~ and having non-integer coordinate values as horizontal or vertical coordinate values.

15. (currently amended): A ~~storing~~ computer-readable storage medium, in which moving picture editing programs for realizing the functions set forth in any one of claims 1-5 or 8-12 in a personal computer are stored.